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4-3 Study Guide and Intervention

Writing Equations in Point-Slope Form

Point-Slope Form

Point-Slope Form	$y - y_1 = m(x - x_1)$, where (x_1, y_1) is a given point on a nonvertical line and m is the slope of the line

Example 1 **Write an equation in point-slope form for the line that passes through (6, 1) with a slope of $-\frac{5}{2}$.**

$y - y_1 = m(x - x_1)$ Point-slope form

$y - 1 = -\frac{5}{2}(x - 6)$ $m = -\frac{5}{2}$; $(x_1, y_1) = (6, 1)$

Therefore, the equation is $y - 1 = -\frac{5}{2}(x - 6)$.

Example 2 **Write an equation in point-slope form for a horizontal line that passes through (4, −1).**

$y - y_1 = m(x - x_1)$ Point-slope form

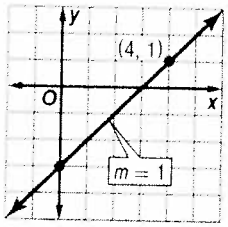
$y - (-1) = 0(x - 4)$ $m = 0$; $(x_1, y_1) = (4, -1)$

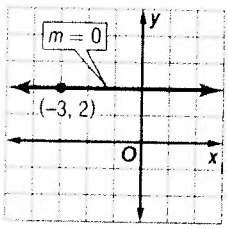
$y + 1 = 0$ Simplify.

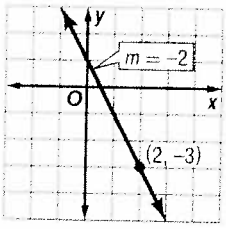
Therefore, the equation is $y + 1 = 0$.

Exercises

Write an equation in point-slope form for the line that passes through the given point with the slope provided.

1. 

2. 

3. 

4. $(2, 1)$, $m = 4$

5. $(-7, 2)$, $m = 6$

6. $(8, 3)$, $m = 1$

7. $(-6, 7)$, $m = 0$

8. $(4, 9)$, $m = \frac{3}{4}$

9. $(-4, -5)$, $m = -\frac{1}{2}$

10. Write an equation in point-slope form for a horizontal line that passes through $(4, -2)$.

11. Write an equation in point-slope form for a horizontal line that passes through $(-5, 6)$.

12. Write an equation in point-slope form for a horizontal line that passes through $(5, 0)$.

Lesson 4-3

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4-3 Study Guide and Intervention *(continued)*

Writing Equations in Point-Slope Form

Forms of Linear Equations

Slope-Intercept Form	$y = mx + b$	m = slope; b = y-intercept
Point-Slope Form	$y - y_1 = m(x - x_1)$	m = slope; (x_1, y_1) is a given point.
Standard Form	$Ax + By = C$	A and B are not both zero. Usually A is nonnegative and A, B, and C are integers whose greatest common factor is 1.

Example 1 **Write $y + 5 = \frac{2}{3}(x - 6)$ in standard form.**

$y + 5 = \frac{2}{3}(x - 6)$	Original equation
$3(y + 5) = 3\left(\frac{2}{3}\right)(x - 6)$	Multiply each side by 3.
$3y + 15 = 2(x - 6)$	Distributive Property
$3y + 15 = 2x - 12$	Distributive Property
$3y = 2x - 27$	Subtract 15 from each side.
$-2x + 3y = -27$	Add $-2x$ to each side.
$2x - 3y = 27$	Multiply each side by -1.

Therefore, the standard form of the equation is $2x - 3y = 27$.

Example 2 **Write $y - 2 = -\frac{1}{4}(x - 8)$ in slope-intercept form.**

$y - 2 = -\frac{1}{4}(x - 8)$	Original equation
$y - 2 = -\frac{1}{4}x + 2$	Distributive Property
$y = -\frac{1}{4}x + 4$	Add 2 to each side.

Therefore, the slope-intercept form of the equation is $y = -\frac{1}{4}x + 4$.

Exercises

Write each equation in standard form.

1. $y + 2 = -3(x - 1)$
2. $y - 1 = -\frac{1}{3}(x - 6)$
3. $y + 2 = \frac{2}{3}(x - 9)$
4. $y + 3 = -(x - 5)$
5. $y - 4 = \frac{5}{3}(x + 3)$
6. $y + 4 = -\frac{2}{5}(x - 1)$

Write each equation in slope-intercept form.

7. $y + 4 = 4(x - 2)$
8. $y - 5 = \frac{1}{3}(x - 6)$
9. $y - 8 = -\frac{1}{4}(x + 8)$
10. $y - 6 = 3\left(x - \frac{1}{3}\right)$
11. $y + 4 = -2(x + 5)$
12. $y + \frac{5}{3} = \frac{1}{2}(x - 2)$

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4-3 Skills Practice

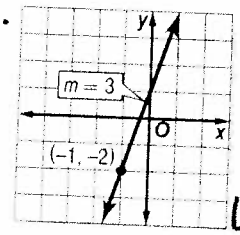
1-9; 19-27

Writing Equations in Point-Slope Form

Write an equation in point-slope form for the line that passes through the given point with the slope provided.

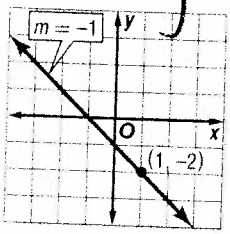
$y - y_1 = m(x - x_1)$

1.

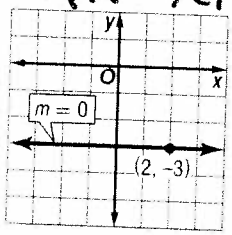


$y+2=3(x+1)$

2.



3.



4. $(3, 1), m = 0$

5. $(-4, 6), m = 8$

6. $(1, -3), m = -4$

7. $(4, -6), m = 1$

8. $(3, 3), m = \frac{4}{3}$

9. $(-5, -1), m = -\frac{5}{4}$

Write each equation in standard form.

10. $y + 1 = x + 2$

11. $y + 9 = -3(x - 2)$

12. $y - 7 = 4(x + 4)$

13. $y - 4 = -(x - 1)$

14. $y - 6 = 4(x + 3)$

15. $y + 5 = -5(x - 3)$

16. $y - 10 = -2(x - 3)$

17. $y - 2 = -\frac{1}{2}(x - 4)$

18. $y + 11 = \frac{1}{3}(x + 3)$

Write each equation in slope-intercept form.

$y = mx + b$

19. $y - 4 = 3(x - 2)$

$y - 4 = 3x - 6$

20. $y + 2 = -(x + 4)$

21. $y - 6 = -2(x + 2)$

22. $y + 1 = -5(x - 3)$

23. $y - 3 = 6(x - 1)$

24. $y - 8 = 3(x + 5)$

25. $y - 2 = \frac{1}{2}(x + 6)$

26. $y + 1 = -\frac{1}{3}(x + 9)$

27. $y - \frac{1}{2} = x + \frac{1}{2}$

Lesson 4-3

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